AXIS 210/211 Network Camera

User's Manual

About this Document

This manual is intended for administrators and users of the AXIS 210/211 Network Camera, and is applicable for software release 4.10. It includes instructions for using and managing the AXIS 210/211 on your network. Previous experience of networking will be of use when using this product. Some knowledge of UNIX or Linux-based systems may also be beneficial, for developing shell scripts and applications. Later versions of this document will be posted to the Axis Website, as required. See also the product's online help, available via the Web-based interface.

Safety Notices Used In This Manual

Caution! - Indicates a potential hazard that can damage the product.
Important! - Indicates a hazard that can seriously impair operation.
Do not proceed beyond any of the above notices until you have fully understood the implications.

Intellectual Property Rights

Axis AB has intellectual property rights relating to technology embodied in the product described in this document. In particular, and without limitation, these intellectual property rights may include one or more of the patents listed at http://www.axis.com/patent.htm and one or more additional patents or pending patent applications in the US and other countries.

This product contains source code copyright Apple Computer, Inc., under the terms of Apple Public Source License 2.0 (see http://www.opensource.apple.com/apsl/).
The source code is available from:
http://developer.apple.com/darwin/projects/rendezvous/

Legal Considerations

Camera surveillance can be prohibited by laws that vary from country to country. Check the laws in your local region before using this product for surveillance purposes.

Electromagnetic Compatibility (EMC)

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Re-orient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment to an outlet on a different circuit to the receiver. Consult your dealer or an experienced radio/TV technician for help. Shielded (STP) network cables must be used with this unit to ensure compliance with EMC standards. If the I/O terminal block connector is used, a ferrite core (available e.g. from Axis) should be fitted around the wires in order to ensure compliance with EMC standards.

USA - This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference.

Europe - CE This digital equipment fulfills the requirements for radiated emission according to limit B of EN55022/1998, and the requirements for immunity according to EN55024/1998 residential, commercial, and light industry.

Japan - This is a class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Australia - This electronic device meets the requirements of the Radio communications (Electromagnetic Compatibility) Standard 1998 AS/NZS 3548.

Liability

Every care has been taken in the preparation of this manual. Please inform your local Axis office of any inaccuracies or omissions. Axis Communications AB cannot be held responsible for any technical or typographical errors and reserves the right to make changes to the product and manuals without prior notice. Axis Communications AB makes no warranty of any kind with regard to the material contained within this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Axis Communications AB shall not be liable nor responsible for incidental or consequential damages in connection with the furnishing, performance or use of this material.

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Support

Should you require any technical assistance, please contact your Axis reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response. If you are connected to the Internet, you can:
- download user documentation and firmware updates
- find answers to resolved problems in the FAQ database. Search by product, category, or phrases
- report problems to Axis support by logging in to your private support area
- visit Axis Support at www.axis.com/techsup/

Safety Notice - Battery Replacement

The AXIS 210/211 uses a 3.0V CR2032 Lithium battery as the power supply for its internal real-time clock (RTC). Under normal conditions this battery will last for a minimum of 5 years. Low battery power affects the operation of the RTC, causing it to reset at every power-up. A log message will appear when the battery needs replacing.

The battery should not be replaced unless required!
If the battery does need replacing, please observe the following:
- Danger of Explosion if battery is incorrectly replaced
- Replace only with the same or equivalent battery, as recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer's instructions.

AXIS 210/211 User's Manual
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Product Features

The AXIS 210 and the AXIS 211 are part of the new generation of fully featured Axis Network Cameras, both being based on the AXIS ARTPEC-2 compression chip. The cameras' images are made available on the network as real-time, full frame rate Motion JPEG streams and/or full frame rate MPEG-4 video streams.

Throughout this user manual, AXIS 210 instructions and information is also valid for the AXIS 211, unless otherwise stated.

The AXIS 210 includes Video Motion Detection, which can be used to trigger e.g. image uploads when there is activity in the video image. Uploads can also be scheduled to run at specified times. Security features include IP address filtering and multilevel password protection.

The AXIS 210 is equipped with an alarm input and an output, which can be connected to various external devices, e.g. door sensors and alarm bells.

Video can be viewed in various different resolutions. Up to 20 viewers can access the camera simultaneously when using Motion JPEG. If MPEG-4 multicast is used, the number of viewers is unlimited, but each viewer needs a separate MPEG-4 license. There is one license included in the product, additional licenses can be purchased separately.

The AXIS 210 has its own built-in Web server, providing full access to all features through the use of a standard web browser. The built-in scripting tool allows the creation of basic applications. For advanced functionality, the camera can be accessed via the AXIS HTTP API (more info at www.axis.com/developer)

AXIS 211 - Extra Features

DC-Iris

The AXIS 211 features a varifocal DC-Iris, which automatically regulates the amount of light entering the camera. Tele/wide and focus are adjusted manually with the aid of the pullers mounted on the lens.

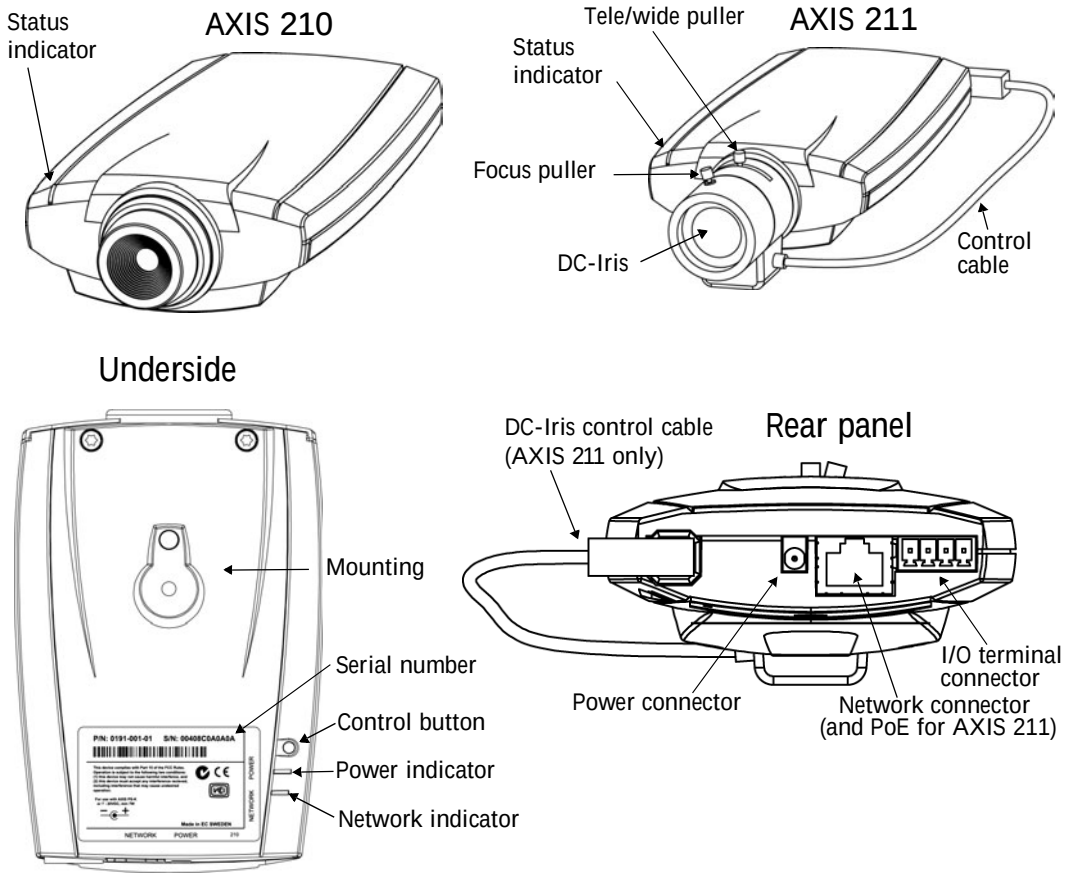
Important!

To use the AXIS 211 outdoors it must be installed in an approved outdoor enclosure. For more information on enclosures, please visit www.axis.com

Power over Ethernet (PoE)

Supporting PoE network transformers conforming to IEEE 802.3af, the AXIS 211 can be powered directly from the network cabling.

Overview



Power Connector - For connection of the PS-K power adapter (included).

I/O Connector block - The I/O terminal connector block provides the physical interface to one transistor output, one digital input and an auxiliary connection point for DC power. For more information, see *The I/O Terminal Block*, on page 49.

Network Connector - The AXIS 210 connects to the network via a standard RJ45 connector. Supporting NWAY, the AXIS 210 detects the speed of the local network segment (10BaseT/100BaseTX Ethernet). This socket can also be used to power the AXIS 211 via PoE (Power over Ethernet).

Serial Number - This number is used during installation. See page 10.

Control Button - Press this button to install using the AXIS Internet Dynamic DNS Service (see page 11) or to restore the factory default settings, as described in *Resetting to the Factory Default Settings, on page 43*.

LED Indicators

After completion of the startup and self test routines, the multi-colored Network, Status, and Power LED indicators flash as follows:

Network	Amber	Steady for connection to 10 Mbit/s network. Flashes for network activity.
	Green	Steady for connection to100 Mbit/s network. Flashes for network activity.
	Red	Flashes rapid red, together with the Status indicator, for hardware error.
	Unlit	No connection.
Status	Green	Shows steady green for normal operation. Can be configured to flash green at intervals whenever the camera is accessed. See the online help for more information.
	Unlit	When configured for “no flash” on camera access.
	Amber	Shows steady amber during reset to factory default or when restoring settings.
	Red	Slow flash for failed upgrade (see *Emergency Recovery Procedure, on page 45*). Rapid flash, together with the Network indicator, for hardware error.
Power	Green	Normal operation.
	Amber	Flashes green/amber during firmware upgrade.

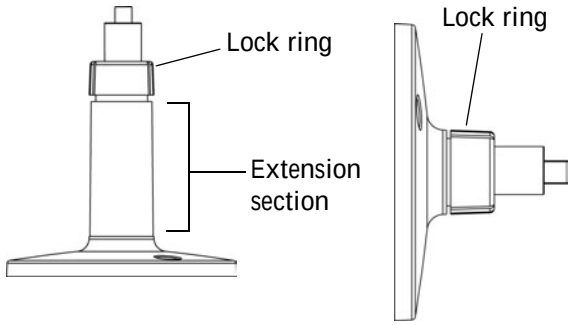
Before Installation

Follow these steps to install the AXIS 210 on your local network (LAN):

1. Familiarize yourself with the camera - see the overview on page 7.
2. Position and mount the camera as required - see below.
3. Connect the cables - see below.
4. Assign an IP address - see *Select Your Installation Method, on page 10*.

Mounting

1. If required, use the 3 supplied screws to fix the base plate to a flat surface.
2. To use the shorter stand, remove the extension section.
3. Attach the camera to the top of the stand.
4. Adjust the camera angle and gently tighten the lock ring.



Important!

The AXIS 210 is designed for indoor use only, and must always be positioned where it is not exposed to direct sunlight or strong halogen light, which can cause permanent damage to the camera's image sensor. Damage as a result of exposure to strong light is not covered by the Axis warranty.

To use the AXIS 211 outdoors it must be installed in an approved outdoor enclosure. Please visit www.axis.com for more information on enclosures.

Cable Connections

1. Connect the AXIS 210 to your network using a standard RJ-45 network cable. If using Power over Ethernet (PoE) with the AXIS 211, this is the only connection required. Step 2 can be skipped.
2. Connect the power adapter to the camera.

Select Your Installation Method

The AXIS 210 is designed for installation on an Ethernet network. This involves assigning it an IP address, automatically (via e.g. DHCP) or manually. Several installation methods are available. The one to use depends on how your network is configured. If unsure of the method to use, please consult your network administrator, or see the network's documentation.

- If your network has an Internet connection (with no HTTP proxy) and uses a DHCP server to assign IP addresses, use the **One-Click installation procedure**. See page 11.
- If your network uses dynamic IP addressing and your computer is running the UPnP™ service, the AXIS 210 will automatically be detected and displayed on your screen. See page 12.
- If you are using e.g. a home broadband router, you may find it convenient to view the router's administration pages to discover which IP address has been assigned to your AXIS 210. Please consult the router's documentation for further information.
- Use **AXIS IP Utility** (see page 12) to discover the IP address. This can also be used to set the IP addess manually.
- Set the IP address manually with the **ARP/Ping** method, as described on page 13.
- The default static IP address for the AXIS 210 is 192.168.0.90

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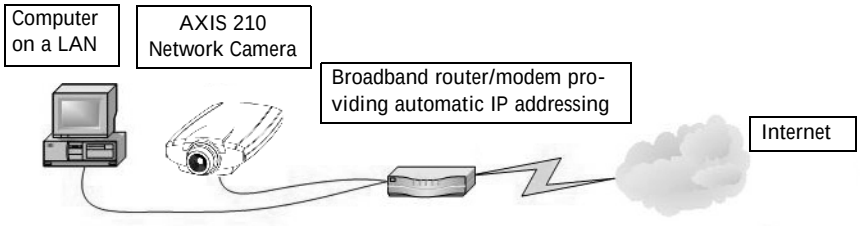
One-click Installation

Requirements:



The AXIS Internet Dynamic DNS Service

- The One-click installation procedure uses the AXIS Internet Dynamic DNS Service. This free service allows you to quickly and simply install your camera, which then receives a static name (DNS name) and a dynamic IP address. More information about the AXIS Internet Dynamic DNS Service is available at www.axiscam.net
- Please note that this procedure will send the AXIS 210's IP address, firmware version, product type and serial number to the Axis Internet Dynamic DNS Service. No personal information is transferred.
- To remove the DNS name and unregister from the Axis Internet Dynamic DNS Service, open the Setup pages in the AXIS 210, click System Options > Network > TCP/IP, click the Settings button for the AXIS Internet Dynamic DNS Service and finally, click the Remove button.

Follow these instructions:

1. Once the network and power cables have been connected (see page 9), wait for the Status indicator to show a steady green.
2. Now press the Control button on the underside of the camera once. The Status indicator on the front of the camera will blink green while it connects to the AXIS Internet Dynamic DNS Service.
3. Wait for the Status indicator to go back to showing a steady green.
4. To complete the installation, now visit www.axiscam.net from an Internet connected PC. This must be done within 60 minutes of pressing the Control button.
5. Follow the on-screen instructions provided by the AXIS Internet Dynamic DNS Service. You will need your product's serial number to complete the installation.

   The serial number (S/N) is on the label on the underside of the AXIS 210.

6. Please see page 16 for instructions on how to set the password.

Note:

If this installation was unsuccessful, try one of the other methods described on the following pages.

UPnP

UPnP™ functionality is enabled by default in the AXIS 210. If also enabled on your computer (Windows ME or XP), the camera will automatically be detected and a new icon will be added to "My Network Places." Click this icon to access the camera. See page 16 for instructions on how to set the password.

Notes:

- To install the UPnP™ service on your computer, open the Control Panel from the Start Menu and select Add/Remove Programs. Select Add/Remove Windows Components and open the Networking Services section. Click Details and then select UPnP as the service to add.
- Once the AXIS 210 is accessible from your computer, it is then possible to use the One-click installation method to provide the camera with a DNS name. See the previous page.

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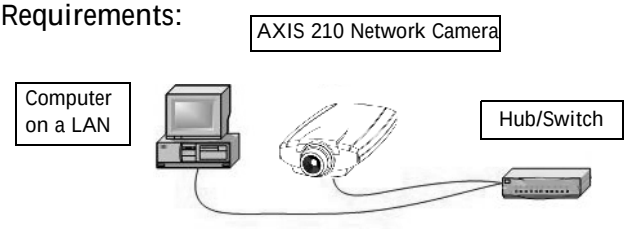
AXIS IP Utility

AXIS IP Utility is a free Windows application that discovers and displays Axis devices on your network. The application can also be used to manually set a static IP address. AXIS IP Utility is available on the CD supplied with the AXIS 210. Updated versions of AXIS IP Utility may be available at www.axis.com

Requirements:



Automatic discovery

1. When connected to the power supply and the network, wait for the Status Indicator on the front of the camera to show a steady green.
2. Insert the CD into your computer's CD drive.
3. Start AXIS IP Utility. When the AXIS 210 appears in the window, double-click it to open its home page.

Set the IP address manually

1. If the AXIS 210 does not appear in the window, click the Refresh button to try again. If the camera still does not appear, you can set the IP address manually. Acquire an unused IP address on the same subnet as your computer.
2. Click the button "Set IP address using serial number" and enter the serial number and IP address for the AXIS 210. Follow the on-screen instructions.

   The serial number (S/N) is on the label on the underside of the AXIS 210.

Note:

After installation, the One-click installation method can be used to obtain a DNS name for the AXIS 210.

Manual Installation with ARP/Ping

1. Acquire an unused IP address for the AXIS 210. This IP address must be on the same subnet as your computer.
2. Locate the serial number (S/N) on the camera's underside label.
3. From a computer on your network, open a Command Prompt (in Windows: from the Start menu, select Run... and type cmd in the field. Click OK).
4. As appropriate for your operating system, enter the following commands:

Windows syntax:	Windows example:
arp -s <IP Address> <Serial Number> ping -l 408 -t <IP Address>	arp -s 192.168.0.125 00-40-8c-18-10-00 ping -l 408 -t 192.168.0.125
UNIX/Linux/Mac syntax:	UNIX/Linux/Mac example:
arp -s <IP Address> <Serial Number> temp ping -s 408 <IP Address>	arp -s 192.168.0.125 00:40:8c:18:10:00 temp ping -s 408 192.168.0.125

5. Check that the network cable is connected. Start/restart the camera by disconnecting and reconnecting the power cable, or the network cable if using PoE (AXIS 211 only).
6. Close the Command prompt when you see 'Reply from 192.168.0.125: ...'
7. The IP address has been set when the Power indicator is permanently lit and the Network indicator flashes intermittently.
8. Start your browser, enter the IP address of the camera in the Location/Address field and press Enter on your keyboard. See below for instructions on how to set the password.

Note:

After installation, the One-click installation method can be used to obtain a DNS name for the AXIS 210.

Client System Requirements

Client computers that will be viewing the video stream from the AXIS 210 should meet the following recommended hardware and software requirements:

- Pentium III (500 MHz processor or better) or AMD Athlon. 128 MB RAM.
- AGP graphics card with 16 MB video memory (32/64 MB for high resolutions/color depths) and support for DirectDraw®. Ensure that the latest available driver is used.
- Sound Card (PCI based).
- Windows® 2000 or Windows XP (with latest Service Pack).
- Internet Explorer 5.5 or higher (with latest Service Pack).
- DirectX® 9.0 or higher.

The AXIS Media Control (Viewing Client)

To view the video stream from the AXIS 210 in a browser, the AXIS Media Control must be installed. This is performed automatically the first time the camera is accessed from a browser. Simply accept the license agreement displayed in the setup window and the client will install. After the installation has completed, restart your computer, if required.

After the client is installed, there will be a new icon in the Windows Control Panel. Clicking on this icon opens the control applet for the AXIS Media Control, from where various settings can be changed. Please see the readme file included in the tool for more information.

The AXIS Media Control can be uninstalled from the Windows Control Panel.

Important!

- The AXIS 210 employs MPEG-4 compression, which is technology licensed by the MPEG Consortium. 1 viewer license is included with the product. The installation of more than 1 instance of the viewer requires you to purchase further licenses. Please contact your Axis reseller.
- To allow the installation of the AXIS Media Control on your workstation, you must have administrator privileges. Your browser must also be set to allow the installation of signed ActiveX controls. This is the default setting in Internet Explorer.
- A viewing license may be used for multicast or unicast clients, but each individual client requires a separate license.

Accessing the Camera

The AXIS 210 can be used with most standard operating systems and browsers. The recommended browser is Internet Explorer with Windows, and Mozilla with other operating systems. See also the *Technical Specifications*, on page 51.

Note: To view streaming video in Microsoft Internet Explorer, you must set your browser to allow ActiveX controls and allow the AXIS Media Control (AMC) to be installed on your workstation. AMC is required to view MPEG-4. If your workstation restricts the use of additional software components, the AXIS 210 can be configured to use a Java applet for updating JPEG images. Please see the online help for more information.

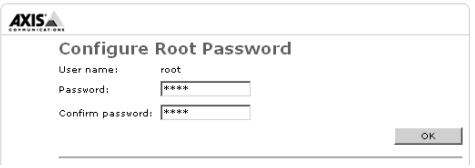
Access From a Browser

1. Start a browser (e.g. Internet Explorer, Mozilla)
2. Enter the IP address or host name of the AXIS 210 in the Location/Address field of your browser.

3. If this is the first time the camera is accessed, see *Setting the Password*, on page 16. Otherwise enter your user name and password, as set by the administrator.
4. The camera's Live View page is now displayed in your browser.

Note: The layout of the web pages in the AXIS 210 may have been customized to meet specific requirements. Consequently, some of the examples and functions featured here may differ from those displayed on your own Live View page.

Setting the Password

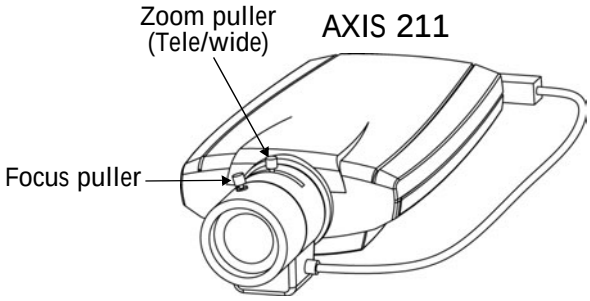


1. When accessing the AXIS 210 for the first time, the 'Configure Root Password' dialog will be displayed on the screen.
2. Enter a password and then re-enter it, to confirm the spelling. Click OK.
3. The 'Enter Network Password' dialog will appear. Enter the User name: root
   Note: The default administrator user name root is permanent and cannot be deleted.
4. Enter the password as set in step 2 above, and click OK. If the password is lost, the AXIS 210 must be reset to the factory default settings. See page 43.
5. If required, click Yes to install the AXIS Media Control (AMC). You will need administrator rights on the computer to do this.

Focusing

To focus the AXIS 210, simply turn the adjustment ring on the lens until the focus is satisfactory. To focus the AXIS 211, follow the instructions below.

1. From the Basic Configuration page in the setup tools, open the Focus adjustment page.
2. Set the DC-Iris to *Disabled* and click Save.
3. Unscrew the zoom puller on the lens by turning it anti-clockwise. Adjust the zoom setting as required. Re-tighten the zoom puller.
4. Unscrew the focus puller on the lens. Adjust the focus as required. Re-tighten the focus puller.



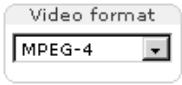
5. From the Focus adjustment page, set the DC-Iris to *Enabled* and click Save.

Note: The DC-Iris should always be disabled while focusing the camera. This opens the iris to its maximum, which gives the smallest depth of field and thus the best conditions for correct focusing. When the focus is set with this method it will then be maintained in any light conditions.

The Live View Page

Depending on whether or not the Live View page has been customized, the buttons described below may or may not be visible.

To resize the image, click the View Size buttons: half-size (x1/2), full-size (x1), x2 or x4. Note that this does not change the image's resolution, but simply how it is displayed. Changing the View size is not available in Sequence Mode.



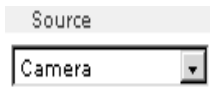
From the Video Format list, select the desired video stream format. Note that Multicast has to be enabled if MPEG-4 is selected. This is configured under Setup > System Options > Network > RTP (multicast).

The Output buttons control the output directly from the Live View page. These buttons are configured under Setup > Live View Config > Layout.

Pulse - click this button to activate the port for a defined period of time, e.g. to switch on a light for 20 seconds.

Active/Inactive - click these buttons to manually start and stop a connected device, e.g. switch a light on/off.

These buttons start and stop the Sequence Mode. This mode is created in Setup > Live View Config > Sequence mode, and automatically displays the view from 2 or more video sources at set intervals.



From the Source list, select the desired external video source. Note that Sequence Mode must be stopped before selecting a source from this list.

The Action buttons can trigger an event directly from the Live View page. These are configured under Setup > Live View Config > Layout.

The Snapshot button saves a snapshot of the image currently being displayed. Right-click on the image to save it in JPEG format on your computer. This button is primarily intended for use when the AMC viewer toolbar is not available.

The AMC viewer toolbar (AXIS Media Control) is available in Microsoft Internet Explorer only. It displays the following buttons:

The Play/Stop buttons start and stop the live video stream.

The Snapshot button saves a snapshot of the image currently being displayed. The Snapshot function and the target directory for saving snapshots can be configured from the AMC Control Applet in the Windows Control Panel (Internet Explorer only).

Click the View Full Screen button to make the video image fill the entire screen area. No other windows will be visible. Press Esc (Escape) on the computer keyboard to exit full screen.

Accessing the AXIS 210 from the Internet

Once installed, your AXIS 210 is accessible on your local network (LAN). To access the camera from the Internet you must configure your broadband router to allow incoming data traffic. For security reasons this is usually done on a specific port. Please refer to the documentation for your broadband router for further instructions.

For more information, please visit the AXIS Internet Dynamic DNS Service at www.axiscam.net or, for Technical notes on this and other topics, visit the Axis Support Web at www.axis.com/techsup

Configuration

This section describes how to configure the AXIS 210, and is intended for product Administrators, who have unrestricted access to all the Setup tools, and Operators, who have access to the settings for Video & Image, Live View Config and Event Configuration.

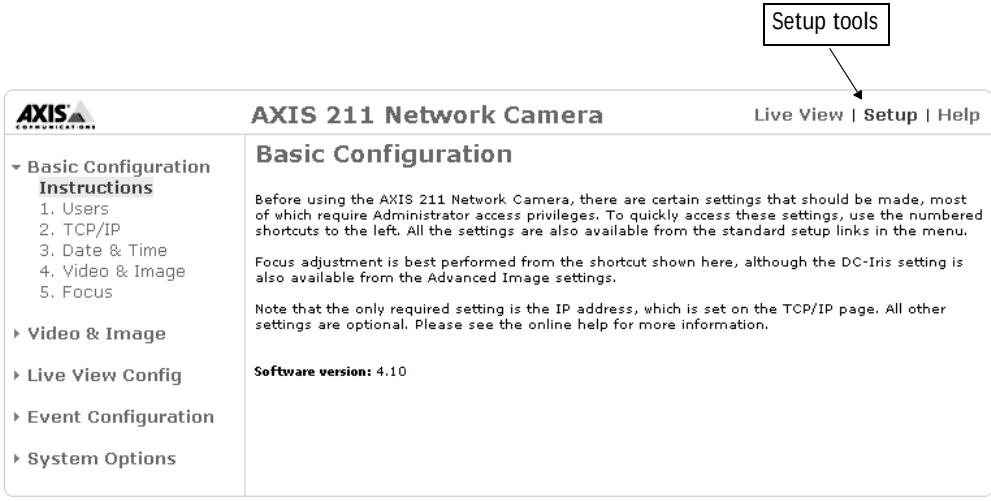
The AXIS 210 is configured under Setup from a standard browser (see *Supported Web Browsers*, on page 51).

Accessing the Setup tools

Follow the instructions below to access the Setup Tools from a browser.

1. Start your browser and enter the IP address or host name of the AXIS 210 in the location/address field.

2. The Live View page is now displayed. Click Setup to display the Setup tools.


Setup tools
AXIS 211 Network Camera
Live View | Setup | Help
Basic Configuration
Instructions
1. Users
2. TCP/IP
3. Date & Time
4. Video & Image
5. Focus
Video & Image
Live View Config
Event Configuration
System Options
Basic Configuration
Before using the AXIS 211 Network Camera, there are certain settings that should be made, most of which require Administrator access privileges. To quickly access these settings, use the numbered shortcuts to the left. All the settings are also available from the standard setup links in the menu.
Focus adjustment is best performed from the shortcut shown here, although the DC-Iris setting is also available from the Advanced Image settings.
Note that the only required setting is the IP address, which is set on the TCP/IP page. All other settings are optional. Please see the online help for more information.
Software version: 4.10

Overview of the Setup tools

Basic Configuration

The links under Basic Configuration are shortcuts providing a convenient way of making the basic settings the first time the unit is configured.

Tools	Description
Instructions	General Instructions
Users	See System Options > Security > Users below
TCP/IP	See System Options > Network > TCP/IP below.
Date & Time	See System Options > Date & Time below
Video & Image	See Video & Image below
Focus (AXIS 211 only)	For help, see the Focus adjustment page in the Setup tools, or see page 16 of this manual.

Video & Image (Administrator/Operator)

Tools	Settings	Description
Video & Image	Image Appearance	Basic image settings - resolution, compression, image rotation, color, brightness and contrast.
	Overlay Settings	Specify text overlays and/or position an image overlay (e.g. a logo) in the video image.
	Video Stream	Used to limit the video stream display time and frame rate.
Overlay Image	Specifies the overlay image to use in the Overlay settings (see above). This is also the page to use for uploading and removing images.	
Statistics/MPEG-4	Shows statistics for the amount of bandwidth and the frame rate currently used. These may be of use during configuration or for troubleshooting bandwidth problems. Only applicable for MPEG-4.	
Advanced	Lighting Conditions	White balance and exposure control settings.
	Low light Behavior	Gives priority to the frame rate or the image quality in low light conditions.
	MPEG-4 Settings	Settings for profile@level, GOV structure and length. Note that changing these settings may affect the amount of bandwidth required for the video stream.

Live View Config (Administrator/Operator)

Tools	Description
Layout	Customize the Live View page, by adding e.g. custom links, manual trigger buttons and manual output control buttons. Default Viewer: set your preferred method of viewing moving images.
HTML Examples	Add live video from your AXIS 210 Network Camera to your own web site, or to an HTML page on your local hard disk.
External Video	Display live video from an external source, i.e. from another Axis device on the network.
Sequence Mode	Configure the camera to automatically display the available video sources at regular intervals. The images can be displayed in order or randomly. The time interval can be set to up to 59 minutes.

Event Configuration (Administrator/Operator)

Tools	Settings / Options / Description
Instructions	General Instructions
Event Servers	Specify destinations for uploaded image files and/or notification messages sent by the camera. FTP servers and HTTP servers can save image files. HTTP servers and TCP servers can receive notification messages.
Event Types	Set up event types so that the AXIS 210 will perform various actions, e.g. upload images to a specified destination. These event types can be Triggered - e.g. they run when an alarm is activated, or Scheduled - the event type runs at a set time.

Tools	Settings / Options / Description
Motion Detection	Set up areas in the image where an alarm is activated whenever movement occurs there. Each motion detection window can be moved, re-sized, or disabled at any time. The behavior for each window is defined by adjusting the Object size, History, and Sensitivity profile sliders. Exclude windows can be used to mask areas where motion should not activate alarms.
Port Status	Shows the status for the camera's input and output - see Ports & Devices under System Options.

System Options (Administrators only)

Tools	Settings / Options / Description	
Security	Users	Access to the camera can be restricted to defined users only (maximum 20). An administrator has unrestricted access to the Setup tools and can determine rights for users at 3 levels; Administrator, Operator or Viewer.
	IP Address Filter	Once enabled, only the IP addresses shown in the list of allowed addresses will be permitted to access the camera. All others will be blocked.
Date & Time		Define the date and time settings for your camera, manually or automatically.
Network	TCP/IP	Specify IP address configuration, DNS configuration, Host Name configuration, Notification of changes to the IP address. Register/unregister for the AXIS Internet Dynamic DNS Service. Specify the HTTP port and network traffic preferences.
	SOCKS	Specify a SOCKS server to use when communicating with hosts on the other side of a firewall/proxy server.
	SMTP	Specify the host names or addresses for your primary and secondary mail servers in the fields provided to allow the camera to send event and error email messages to predefined email addresses.
	UPnP	The AXIS 210 includes support for UPnP. Enable UPnP and enter a user-friendly name for the camera. Note that UPnP is enabled by default.
	RTP (multicast)	Enable/disable multicast and specify multicast addresses. Only applicable when MPEG-4 is used as the video format.
Ports and Devices	I/O Ports	Configure the camera's input and output. Enter descriptive names and specify the ports' Normal states (Open circuit or Grounded circuit).
LED settings		The Status LED can be made to flash whenever the camera is accessed.
Maintenance		Functions for restarting the camera, restoring settings, upgrading the camera, backing up and restoring configurations.
Support	Support Overview	Links to the Troubleshooting guide, the Server report (always include this when requesting support) and the Axis Support Service.
	Logs & Reports	Generate Logs (all log information is shown in one file), reports (information about the camera's status) and a parameter list.
	About	Link to the source code for the Linux kernel, Boa and more.
Advanced	Scripting	This powerful function allows users to customize and use their own scripts, for creating specialized applications.
	Plain Config	Plain config allows direct access to all the configurable parameters.

Video and Image

The following descriptions offer examples of the features available in the AXIS 210. For details of each setting, please refer to the online help available from the setup tools. Click to access the online help.

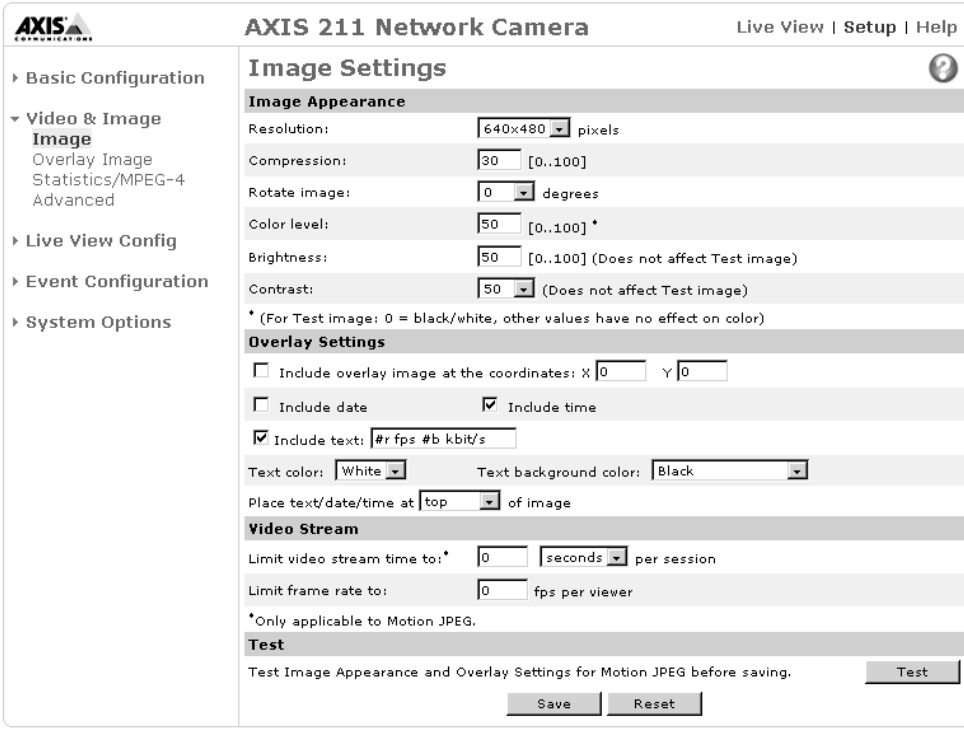

AXIS 211 Network Camera
Live View | Setup | Help
Basic Configuration
Video & Image
Image
Overlay Image
Statistics/MPEG-4
Advanced
Live View Config
Event Configuration
System Options
Image Settings
Image Appearance
Resolution: 640x480 pixels
Compression: 30 [0..100]
Rotate image: 0 degrees
Color level: 50 [0..100] *
Brightness: 50 [0..100] (Does not affect Test image)
Contrast: 50 (Does not affect Test image)
* (For Test image: 0 = black/white, other values have no effect on color)
Overlay Settings
Include overlay image at the coordinates: X 0 Y 0
Include date
Include time
Include text: #r fps #b kbit/s
Text color: White
Text background color: Black
Place text/date/time at top of image
Video Stream
Limit video stream time to:* 0 seconds per session
Limit frame rate to: 0 fps per viewer
*Only applicable to Motion JPEG.
Test
Test Image Appearance and Overlay Settings for Motion JPEG before saving.
Test
Save
Reset

Image Settings

Use the Image Appearance settings to change the image as required.

The configuration of the image and overlays will affect the camera's overall performance, depending on how it is used and on the available bandwidth. Lower compression improves image quality, but increases the bandwidth.

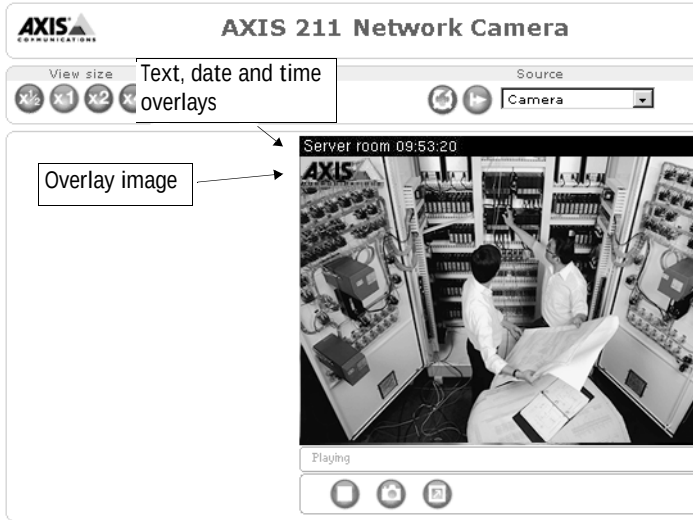
Note: When using MPEG-4 as the video format, this setting will define the minimum compression level. The compression level will temporarily increase as and when required, i.e. when the bit rate approaches the maximum value as defined in the current profile@level combination.

The image can be rotated and also fine-tuned by adjusting the color level, the brightness and the contrast. Please see the online help for further information on these settings.

Changed image settings have immediate effect on the MPEG-4 stream, but a new Motion JPEG stream will have to be started (or restarted) before the settings will take effect.

Overlay Settings

Include an image, e.g. your company logo, and/or the date and time and text. Text overlays are all included on one line at the top or bottom of the video image. Image overlays can be placed anywhere in the video image. To upload an overlay image, see below.



Note: If a part of a monitored area should not be displayed, this can be masked by placing an overlay image over that area. Using coordinates to position the overlay image allows precision masking.

Video Stream

Define the maximum video stream time per session in seconds, minutes or hours. When the set time has expired, a new stream can be started by refreshing the page in the Web browser. For unlimited video stream time, set this value to 0. This setting is only applicable to Motion JPEG.

The frame rate allowed to each viewer can also be limited, to avoid bandwidth problems on the network. To allow the highest available frame rate, set to 0.

Test

For a preview of the image and overlay settings before saving, click Test. When satisfied with the settings, click Save. Please note that the preview image will be in JPEG format, even though the settings are valid both for Motion JPEG and MPEG-4.

Overlay Image

An overlay image is an image included in the video image. This might, for example, be your own company logo.

Follow these instructions to upload and use an overlay image:

1. To upload the file (a logo or image) to the AXIS 210, click the Browse button and locate it on your computer or server.
2. Click the Upload button and follow the on-screen instructions.
3. The image is now available in the Use overlay image drop-down list.

4. Click Save.

Overlay image requirements:

Image Formats	Image Size
• Windows 24-bit BMP (full color) • Windows 4-bit BMP (16 colors) • OS/2 4-bit BMP (16 colors)	The height and width of the overlay image in pixels must be exactly divisible by 4.

Overlay image limitations:

- The maximum overlay image size supported by the AXIS 210 is 640x480, even when using a lower resolution. The overlay is automatically rescaled along with the image. See also the Technical Specifications, on page 46.
- Note that when a text overlay is also used, this reduces the amount of space available to the overlay image. To keep the text readable at lower resolutions, the text overlay occupies proportionally more and more space, i.e., 16 pixels in height at 640x480, 32 pixels at 320x240 and 64 pixels at 160x120.
- If the overlay is initially positioned so that part of it is outside the video image, it will be relocated so that it appears over the video image, i.e. it is always the entire image that is displayed.

See also the online help .

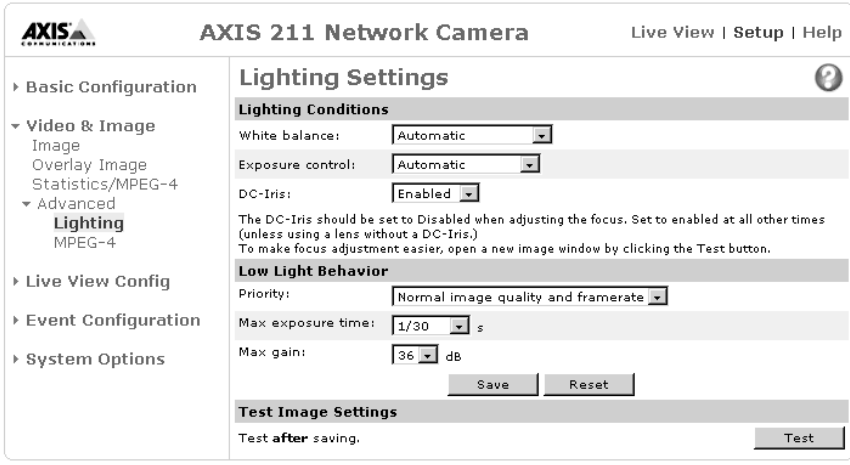
Statistics MPEG-4

When using the MPEG-4 video format, various statistics are available. These may be of use during configuration or for troubleshooting bandwidth problems.

Advanced Settings

These web pages includes different settings for fine-tuning the image, Note that the advanced settings available depend on the camera model.

Lighting Settings

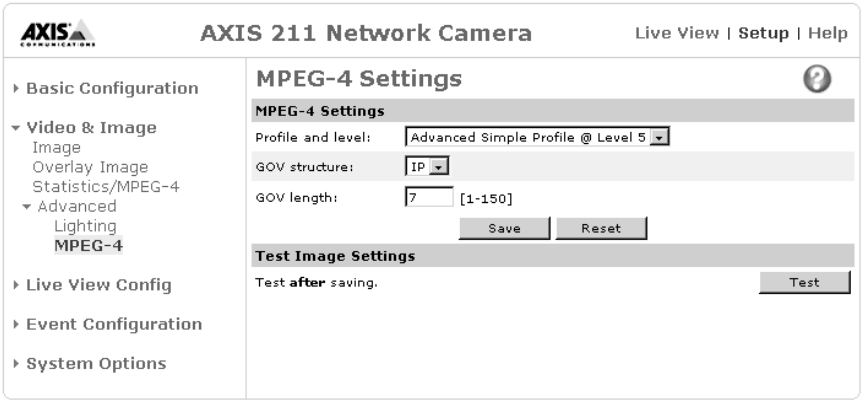


To compensate for the Lighting conditions the white balance and the exposure control can be adjusted. DC-Iris should always be enabled except during focusing, or when using a non-DC-Iris lens.

The settings for Low-light behavior determine how the AXIS 210 will behave at low light levels. These settings all affect image quality and are basically a measure of how much noise to allow in the images.

Please see the online help for further instructions on these settings.

MPEG-4 Settings



The MPEG-4 standard provides many different coding tools for various applications in different situations. Usually, subsets are defined and used, as it is not reasonable to expect all MPEG-4 clients to support all of these tools. The viewing client must support the subset used for the video stream or the MPEG-4 stream can not be viewed. The subset used is commonly referred to as profile@level, where the profile defines the syntax and semantics of the tool subset and the level describes the restrictions imposed on the profile, in terms of e.g. bandwidth.

The profiles and levels supported by the AXIS 210 are as follows:

Profile@Level	Properties
Advanced Simple Profile @ Level 3	Max bit rate = 768 kbit/s ISMA compliant
Advanced Simple Profile @ Level 5	Max Bit rate = 8 Mbit/s

Level 5 is to prefer if there is enough bandwidth available, as the image quality of the video stream will be better than if level 3 is used.

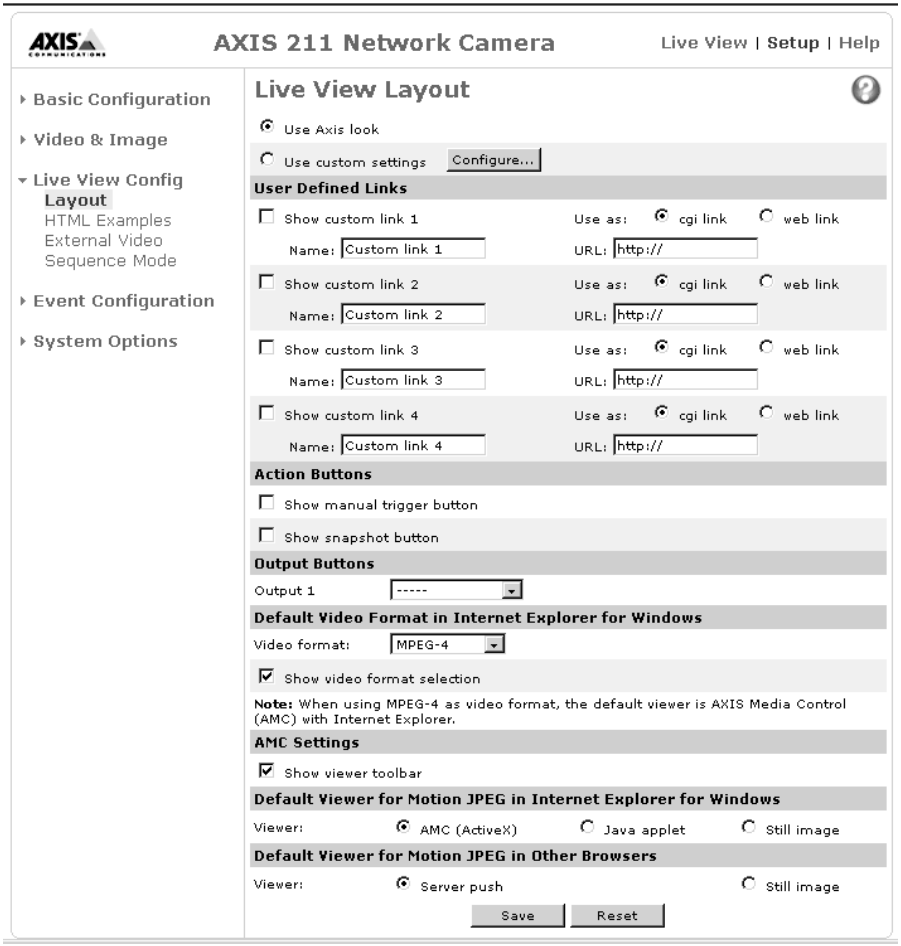
The GOV structure can be set to either I or IP, which describe the type of images included in the video stream, as well as their internal order. An I-image is a complete image, whereas a P-image is the differences in the image compared to the previous image in the video stream. The I-structure thus consists of a sequence of complete images. The IP-structure consists of I-images each followed by a number of P-images, using much less bandwidth than the I-structure.

The GOV length determines the sum total of P-images and I-images in a GOV. Setting the GOV length to a high value saves considerably on bandwidth. However there may be a noticeable decay in the image at high values.

Note: GOV = Group of VOPs
VOP = Video Object Plane
Video Object Plane = image

Live View Config

The features on the AXIS 210 Live View page can be customized to suit your requirements, or you can upload and use your own custom web page. This is done by the administrator from Setup > Live View Config > Layout.



Custom Settings

To use your own custom web page, click the radio button Use custom settings and click Configure.

Upload Own Web Files

Your own web files, background pictures, etc., must first be uploaded to the AXIS 210 in order to be available for selection in the Custom Settings setup dialog. Once uploaded, the files are shown in the drop-down lists.

1. Click the Upload/Remove button.

2. Enter the path to the file, e.g. a file located on your workstation or click the Browse button.
3. Select the user level for the uploaded file. Setting the user access level means that you have complete control over which pages can be viewed by which users.
4. When the path is shown correctly in the text field, click the Upload button.

All uploaded files are shown in the list in the lower section of the page. To remove a file, check the box provided next to it and then click the Remove button.

Modify the Axis Look

The Axis Look of the default home page can be modified from this dialog, using previously uploaded files or files located elsewhere.

- To use your uploaded file, check the Own radio button and select the file from the drop-down list.
- To use a file located somewhere other than in the AXIS 210, click the External radio button and enter the URL.

Unchecking the box for Show setup link will remove the setup link from the product's Home Page. The Setup Tools will then only be accessible by entering the full setup address into the address/URL field of a browser.

> If the setup link is missing, setup can be reached at this url:
> http://<ip address>/operator/basic.shtml.

Own Home Page

To use a previously uploaded web page as the default page, check the box, select the page from the drop-down list and click OK.

User-defined Links

Enter a descriptive name and enter the URL in the provided field.

Example

1. Check Show Custom Link 1
2. Enter a descriptive name, e.g. My Website
3. Check the radio button for web link.
4. Enter the web link: e.g. http://www.example.com
5. Click Save.

This link will then be shown on the Live View page and will open the specified website.

User-defined CGI links can be used to issue advanced commands via the Axis HTTP API. For more information, see the Developer pages at www.axis.com/developer

Action Buttons

These buttons can be used to manually trigger and stop an event from the Live View page. See *Event Configuration*, on page 32.

Enabling the display of the Snapshot button allows users to save a snapshot from the video stream by clicking the button. This button is mainly intended for use with browsers other than Internet Explorer (IE), or when otherwise not using ActiveX to view the video stream. The ActiveX viewing component (AXIS Media Control) for IE provides its own snapshot button.

Output Buttons

These buttons can then be used to manually activate the output from the Live View page, e.g. to switch a light on and off. There are 2 options for how the output is activated:

- The Pulse button activates the output for a defined period
- Active/Inactive displays 2 buttons, one for each action (on/off)

Default Video Format in Internet Explorer for Windows

Select default video format from the dropdown menu. Tick the box to enable video format selection on the Live View Page. When using MPEG-4 as video format, the default viewer is AXIS Media Control with Internet Explorer.

Note: It is possible to view Motion JPEG when MPEG-4 is chosen as default and vice versa.

AMC Settings

Check the Show viewer toolbar box to display the AXIS Media Control (AMC) viewer toolbar under the image in your browser. The toolbar is only available when using AMC.

Default Viewer for Motion JPEG

Select the appropriate radio button to define the method for viewing moving images, depending on your browser and settings.

Please see the online help for more information.

HTML Examples

You can add live video from the AXIS 210 to your own web site. The camera can send a Motion JPEG stream to up to 20 simultaneous connections, although an administrator can restrict this to fewer. If MPEG-4 is set as video format, multicasting is used and the video stream will be available for an unlimited number of viewers connected to the parts of the network where multicast is enabled. Please note that a separate MPEG-4 license is required for each viewer.

Enter the Video Format, Image Type, Image size and other settings to suit your Web page and click Update. The AXIS 210 then generates the required source code for your configuration. Copy this code and paste it into your own Web page code.

External Video

The AXIS 210 can also display images from other Axis network cameras and video servers. These are known as External Video sources. Each external video source is available from the drop-down list on the Live View page.

Click the Add button to open the External Video Source Setup dialog, which is used to make all the necessary settings. Enter the IP address or host name of the external video source you wish to add. The user can then choose to receive either MPEG-2, MPEG-4 or Motion JPEG video stream.

Sequence Mode

The Live View page can be configured to rotate through the internal and selected external video sources, in order, or randomly.

Select the desired video sources and enter the time in seconds to display each source (up to 59 minutes). Click Save.

The Sequence buttons will appear on the Live View page to enable the viewer to start and stop the sequence mode.

Please see the online help for more information.

Event Configuration

An event in the AXIS 210 is when an Event Type is activated and causes certain actions to be performed. The event type is the set of parameters (or conditions) that specifies how and when which actions will be performed. A common event type is when the camera uploads images when an alarm occurs. Many event types use an Event Server, to e.g. upload images to.

This section describes how to set up event servers and event types, i.e. how to configure the AXIS 210 to perform certain actions when events (e.g. alarms) occur.

Definitions

Event type	A set of parameters describing how and when the camera will perform certain actions	
Triggered Event - see page 33	The circumstances that start an event.	E.g. on a signal from an external device, such as a door switch or a motion sensor.
Scheduled Event - see page 34	Time period(s) in which an event will run.	Pre-programmed time periods.
Action	What occurs when the event triggers.	E.g. the upload of images to an FTP server, email notification, etc.

Event Servers

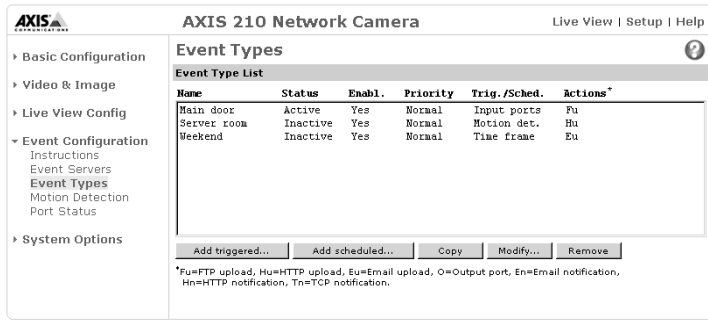
Event Servers are used to receive e.g. uploaded image files and/or notification messages. To set up Event server connections in your AXIS 210, go to Setup > Event Configuration > Event Servers and enter the required information for the required server type.

Server type	Purpose	Information required
FTP Server	• Receives uploaded images	• Descriptive name of your choice • Network address (IP address or host name) • User Name and Password (for FTP server) • Upload path e.g. images/ • Port number e.g. port 21 • Use passive mode if there is a firewall between the camera and FTP server
HTTP Server	• Receives notification messages • Receives uploaded images	• Descriptive name of your choice • URL (IP address or host name) • User Name and Password (for HTTP server) • Proxy address/Proxy port (if required) • Proxy User Name and Password (if required)
TCP Server	• Receives notification messages	• Descriptive name of your choice • Network address (IP address or host name) • User Name and Password (for TCP server) • Port number e.g. port 80

For details on each setting, please see the online help available from each web page.

When the setup is complete, the connection can be tested by clicking the Test button (the connection test takes approximately 10 seconds).

Configuring Event Types



An Event Type describes how and when the camera will perform certain actions.

Example: If somebody passes in front of the camera, and an event that uses motion detection has been configured to act on this, the camera can e.g. record and save images to an FTP server, and/or send a notification email to a pre-configured email address with a pre-configured message. Images can be sent as email attachments.

Triggered Event

A Triggered event can be activated by e.g:

- a switch (e.g. a doorbell) connected to the camera's input port
- detected movement in a configured motion detection window
- a manually activated action, e.g. from an action button in the web interface
- on restart (reboot) after e.g. power loss

How to set up a triggered event

This example describes how to set the camera to upload images when e.g the main door is opened:

1. Click Add triggered on the Event types page.
2. Enter a descriptive name for the event, e.g. Main door open.
3. Set the priority - High, Normal or Low (see the online help).
4. Set the Respond to Trigger... parameters for when the event will be active, e.g. only after office hours.
5. Select the trigger alternative from the Triggered by... drop-down list, e.g. select Input ports, for the sensor connected to the door.
6. Set the When Triggered... parameters, i.e. define what the camera will do if the main door is opened e.g., upload images to an FTP server.
7. Click OK to save the Event in the Event Types list.

Please see the online help for descriptions of each available option.

Note: Up to 10 event types can be configured in the AXIS 210, and up to 3 of these can be configured to upload images.

Pre-trigger and Post-trigger buffers

This function is very useful when checking to see what happened immediately before and/or after a trigger, e.g. 30 seconds before and/or after a door was opened. Check the Upload images checkbox under Event Types > Add Triggered... > Triggered by... to expand the web page with the available options. All uploaded images are JPEG images.

Include pre-trigger buffer - images stored internally in the server from the time immediately preceding the trigger. Check the box to enable the pre-trigger buffer, enter the desired length of time and specify the required image frequency.

Include post-trigger buffer - contains images from the time immediately after the trigger. Configure as for pre-trigger.

Notes:
- Pre-trigger and Post-trigger buffers will be lost if the connection to the event server fails.
- The maximum length of the pre-/post-buffer depends on the image size and selected frame rate.
- If the pre- or post-buffer is too large for the camera's internal memory, the frame rate will be reduced and individual images may be missing. If this occurs, an entry will be created in the unit's log file.

Continue image upload (unbuffered) - enables the upload of images for a fixed length of time. Specify the length of time for the uploaded recording, in seconds, minutes or hours, or for as long as the trigger is active. Finally, set the desired image frequency to the maximum (the maximum available) or to a specified frame rate. The frame rate will be the best possible, but might not be as high as specified, especially if uploading via a slow connection.

Scheduled Event

A Scheduled event can be activated at preset times, in a repeating pattern on selected weekdays.

Configuration example:

1. Click Add scheduled on the Event types page.
2. Enter a descriptive name for the event, e.g. "Scheduled email upload."
3. Set the priority (High, Normal or Low).
4. Set the Activation Time parameters (24h clock) when the event will be active, e.g. start on Sundays at 13.00 with a duration of 12 hours.
5. Set the When Activated... parameters, i.e. set what the camera will do at the specified time, e.g. send uploaded images to an email address.
6. Click OK to save the Event in the Event Types list.

Please see the online help for descriptions of each available option.

Motion Detection

The motion detection feature is used to generate an alarm whenever movement occurs (or stops) in the image. A total of 10 Include and/or Exclude windows can be configured.

- Included windows target specific areas within the whole image
- Excluded windows define areas within an Include window that should be ignored (areas outside Include windows are automatically ignored)

Once configured, the motion detection windows will appear in the list of available triggers, for triggering events. See *How to set up a triggered event* above.

Note: Using the motion detection feature may decrease the camera's overall performance.

How to configure Motion Detection

1. Click Motion Detection in the Event Configuration menu.
2. Click the Configure Included Window radio button.
3. Click New.
4. Enter a descriptive name under Window name.
5. Adjust the size (drag the bottom right-hand corner) and position (click on the text at the top and drag to the desired position).
6. Adjust the Object size, History and Sensitivity profile sliders (see table below for details). Any detected motion within an active window is then indicated by red peaks in the Activity window (the active window has a red frame).

7. Click Save.

To exclude parts of the Include window, click the Configure Excluded Windows button and position the Exclude window as required, within the Include window.

Please see the online help for descriptions of each available option.

	Object Size	**History**	**Sensitivity**
High level	Only very large objects trigger motion detection	An object that appears in the region will trigger the motion detection for a long period	Ordinary colored objects on ordinary backgrounds will trigger the motion detection
Low level	Even very small objects trigger motion detection	An object that appears in the region will trigger motion detection for only a very short period	Only very bright objects on a dark background will trigger motion detection
Default value	Low	Medium to High	Medium to High

Examples:

- Avoid triggering on small objects in the image by setting the object size level to high.
- To trigger motion detection as long as there is activity in the area, select a high history level.
- To reduce the number of triggers if there is a lot of movement during a short period of time, select a high history level.
- To only detect flashing light, low sensitivity can be selected. In other cases, a high sensitivity level is recommended.

Port Status

Under Event Configuration > Port Status there is a list showing the status for the AXIS 210's input and output. This is for the benefit of Operators, who have no access to the System Options section.

Example: If the Normal state for a doorbell push button connected to an input is set to Open circuit - as long as the button is not pushed, the state is inactive. If the doorbell button is pushed, the state of the input changes to active.

System Options

Security

User access control is enabled by default. An administrator can set up other users, by giving these user names and passwords. It is also possible to allow anonymous viewer login, which means that anybody may access the Live View page, as described below:

Users - the user list displays the authorized users and user groups (levels):

Viewer	Provides the lowest level of access, which only allows access to the Live View page.
Operator	An Operator can view the Live View page, create and modify event types and adjust certain other settings. Operators have no access to the Systems Options.
Administrator	An administrator has unrestricted access to the Setup Tools and can determine the registration of all other users.

User Settings - check the relevant checkboxes to enable:

- Anonymous viewer login - allows any viewer direct access to the Live View page.
- Maximum number of simultaneous viewers - enter a value here to restrict the number of Motion JPEG viewers accessing the unit. This is useful if you need to save on bandwidth.

IP Address Filter

The administrator can add up to 256 IP addresses to the Allowed IP Addresses list. If the IP address filtering checkbox is checked, only the IP addresses in the list will be allowed access to the camera.

The users from these IP addresses need to be specified in the user list with the appropriate access rights (User, Operator or Administrator).

Referrals - to prevent unauthorized sources from including the video stream from the AXIS 210 into external Web pages, check the Referrals checkbox and enter the IP address or Host name of the computer that hosts the Web pages with the included video stream. Several IP addresses/host names can be defined and are separated by semicolons(;). This option is only applicable to Motion JPEG video streams.

Note: When you are restricting referrals, but also wish to allow normal viewing of the Live View page, the AXIS 210's IP address or host name must also be added to the list of allowed referrers.

Date & Time

Current Server Time - displays the current date and time (24h clock). The time can be displayed in 12h clock format in the Overlay Images (see below).

New Server Time - Select your time zone from the drop-down list and check the daylight saving time changes, if desired.

From the Time Mode section, select the preferred method to use for setting the time:

- Synchronize with computer time - sets the time from the clock on your computer.
- Synchronize with NTP Server - the camera will obtain the time from an NTP server every 60 minutes. Specify the NTP server's IP address or host name.
- Set manually - this option allows you to manually set the time and date.

Note: Note that if using a host name for the NTP server, a DNS server must be configured under TCP/IP settings. See Network > TCP/IP below.

Date & Time Format Used in Images - specify the formats for the date and time (12h or 24h) displayed in the Live View video streams.

Use the predefined formats or use your own custom date and time formats. See Advanced File Naming & Date/Time Formats in the help files for information on how to create your own file formats.

Network - TCP/IP Settings

IP Address Configuration

The camera's IP address can be set automatically via DHCP, or a fixed IP address can be set manually. A host name can be used and there are options for setting up notification of changes in the IP address. DHCP is enabled by default.

Note: DHCP is a protocol for automatic IP address assignment on a network. IP address assignment via DHCP may lead to the situation where the IP address changes and you thus lose contact with the unit. To prevent this, configure the options for notification of IP address change (under Services) to receive notification whenever the IP address for the camera changes.

Alternatively, if your DHCP server can update a DNS server, you can access the AXIS 210 by a host name, which is always the same, regardless of the IP address.

Auto-Configure Link-Local Address is enabled by default and assigns the AXIS 210 an additional IP address for use with the UPnP protocol. The AXIS 210 can have both a Link-Local IP and a static/DHCP-supplied IP address at the same time - these will not affect each other. See *UPnPTM*, on page 40.

DNS Configuration

The Domain Name Service (DNS) provides the translation of host names to IP addresses on your network.

Obtain DNS server address via DHCP - automatically use the DNS server settings provided by the DHCP server. Click the View button to see the current settings.

Use the following DNS server address - enter the desired DNS server by specifying the following:

Domain name - enter the domain(s) to search for the host name used by the AXIS 210. Multiple domains can be separated by semicolons (;). The host name is always the first part of a Fully Qualified Domain Name, e.g. myserver is the host name in the Fully Qualified Domain Name myserver.mycompany.com where mycompany.com is the Domain name.

DNS servers - enter the IP addresses of the primary and secondary DNS servers.

Host Name Configuration

The AXIS 210 can be accessed using a host name instead of an IP address. The host name is usually the same as the assigned DNS Name. It is always the first part of a Fully Qualified Domain Name and is always one word, with no period. For example, myserver is the host name in the Fully Qualified Domain Name myserver.mycompany.com.

Enable dynamic DNS updates - The AXIS 210 includes support for dynamically updating local DNS servers whenever the product's IP address changes. Check this box to enable the function.

> Note that these settings concern the use of local DNS servers and should not be confused with the settings for the Axis Internet Dynamic DNS service.

Register DNS name - The name entered here will be associated with the AXIS 210's IP address in the DNS server. An example of a DNS name is Axisproduct.example.com

TTL (Time To Live) - This value determines how long (in seconds) the reply from the DNS server should be remembered by clients when they check that the domain name for the registered IP address is still valid. This reduces the number of times the client has to query the DNS server, which in turn reduces network usage.

Services

Options for notification of IP address change - if the IP Address for the camera is changed automatically, e.g. by DHCP, you can choose to be notified. Click Settings... and enter the required information.

AXIS Internet Dynamic DNS Service - If the AXIS 210 has been registered with the Axis Internet Dynamic DNS service and the IP address for the product changes, the service is updated to reflect the change. Check the box to enable/disable automatic updates.

The domain name currently registered at the Axis Internet Dynamic DNS service for your product can be removed at any time. To do this click Settings... and follow the instructions. For more information, please refer to the online help.

HTTP

The default HTTP port number (port 80) can be changed to any port within the range 1024-65535. This is useful for e.g. simple security port mapping.

Network Traffic

The default setting is Auto-negotiate which means that the correct speed is automatically selected. If necessary, the connection speed can be set by selecting it from the drop-down list.

Maximum bandwidth - Specify, in Mbit/s or Kbit/s, the maximum bandwidth that the camera is allowed to use on the network. This is a useful function when connecting the camera to busy or heavily loaded networks. The default setting is Unlimited. For more information, please refer to the online help .

SOCKS

SOCKS is a network proxy protocol. The AXIS 210 can be configured to use a SOCKS server to reach networks on the other side of a firewall/proxy server. This functionality is useful if the camera is located on a local network behind a firewall, but notifications, uploads, alarms, etc., need to be sent to a destination outside the local network (e.g. to the Internet).

SMTP (email)

Enter the host names or addresses for your primary and secondary mail servers in the fields provided, to enable the sending of event and error email messages from the camera to predefined addresses via SMTP.

UPnP™

The AXIS 210 includes support for UPnP, which is enabled by default. If also enabled on your computer, the camera will automatically be detected and a new icon will be added to "My Network Places."

Note: UPnP must also be enabled on your Windows XP or ME computer. To do this, open the Control Panel from the Start Menu and select Add/Remove Programs. Select Add/Remove Windows Components and open the Networking Services section. Click Details and then select UPnP as the service to add.

RTP (multicast)

Multicast must be enabled for these settings to take effect. The settings are only valid when MPEG-4 is used as the video format. Multicast is automatically configured and should normally not be changed. Enter the IP address and the port number to use for the video stream in the required fields.

Only IP addresses within certain ranges can be used for multicasting. The AXIS 210 has been pre-configured with an address from these ranges, and this does not normally need to be changed. Please contact your network administrator if you have special requirements.

Notes:
- The viewers do not need to know this IP address or port number, but simply the main IP address or host name otherwise used for accessing the AXIS 210.
- Setting the video port number to 0 means a random port number will be used.

If IP packets (i.e. data) fail to be delivered to their destination within a reasonable length of time the number entered in the Time to live field tells the network routers when to discard the packet. The value is usually measured in 'hops', i.e. the number of network routers that can be passed before the packet arrives at its destination or is dropped.

Ports & Devices

I/O Ports - the pinout, interface support and the control and monitoring functions provided by this connector are described in *The I/O Terminal Block*, on page 49.

LED Settings

The Status indicator LED on the front of the camera can be set to flash at a configurable interval (or to not light up at all) whenever the unit is accessed. For a listing of all LED behavior, see page 8, or the online help.

Note: The LED does not flash when the stream is retrieved using MPEG-4 multicast.

Maintenance

- Restart - The unit is restarted without changing any of the settings. Use this method if the unit is not behaving as expected.
- Restore - The unit is restarted and most current settings are reset to the factory default values. The only settings saved are:
  - the boot protocol (DHCP or static)
  - the static IP address
  - the default router
  - the subnet mask
  - the system time

- Default - The Default button should be used with caution. Pressing this will return all of the camera's settings, including the IP address, to the factory default values. The camera will then have to be re-installed.

Upgrade Server - See *Upgrading the Firmware*, on page 44.

Backup - To take a backup of all of the parameters, and any user-defined scripts, click the Backup button. If necessary, it is then possible to return to the previous settings if the settings are changed and there is unexpected behavior.

Restore - click the Browse button to locate the saved backup file (see above) and then click the Restore button. The settings will be restored to the previous configuration.

Note: Backup and Restore can only be used on the same unit running the same firmware. This feature is not intended for the configuration of multiple units or for firmware upgrades.

Support

The support overview page provides valuable information on troubleshooting and contact information, should you require technical assistance.

Logs & Reports - when contacting Axis support, please be sure to provide a valid Server Report with your query.

View Information - The Log file, the Server Report and the Parameter List all provide valuable information for troubleshooting and when contacting Axis support.

Configuration

Log Level for Log Files - from the drop-down list, select the level of information to be added to the Log file

Log Level for Email - from the drop-down list, select the level of information to send as email and enter the destination email address.

Resetting to the Factory Default Settings

To reset the AXIS 210 to the original factory default settings, go to the System Options > Maintenance web page (as described in *Maintenance*, on page 41) or use the Control button on the underside of the camera (see the illustration on page 7) as described below:

Using the Control Button

To reset the AXIS 210 to the factory default settings using the Control Button:

1. Disconnect the power adapter, or the network cable if using PoE (AXIS 211 only).
2. Press and hold the Control button while reconnecting the power.
3. Keep the Control button pressed until the Status Indicator displays amber (this may take up to 15 seconds).
4. Release the Control button.
5. When the Status Indicator changes to Green (which may take up to 1 minute), the process is complete and the AXIS 210 has been reset. The unit will now have the default IP address 192.168.0.90

Advanced

Scripting is an advanced function that provides the means for customizing and using scripts.

Caution!
The scripting function is a very powerful tool. Improper use may cause unexpected behavior or even loss of contact with the unit. If a script does cause problems, reset the unit to its factory default settings (in which case, a previously saved backup file will be useful for returning the unit to its latest configuration). Axis strongly recommends that you do not use this function unless you fully understand the consequences. Axis support provide no assistance for customized scripts.

For more information, please visit the Developer pages at www.axis.com/developer

Plain Config - this function is for the advanced user with previous experience of configuring Axis cameras. All parameters can be set and modified from this page. Help is available via the links on the standard setup pages.

Troubleshooting

Checking the Firmware

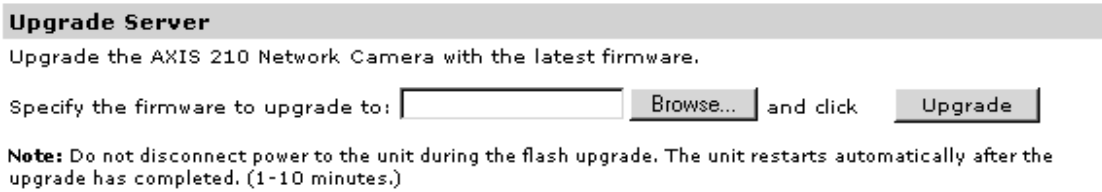
One of your first actions when troubleshooting a problem should be to check the currently installed firmware version. The latest version may contain a correction that fixes your particular problem. The current firmware version in your AXIS 210 can be seen on the page Setup > Basic Configuration.

Upgrading the Firmware

Firmware is software that determines the functionality of the AXIS 210. When you upgrade the firmware with a file from the Axis Web site, your Axis camera will receive the latest available functionality. Always read the upgrade instructions and release notes available with each new release, before updating the firmware.

Note: Preconfigured and customized settings will be saved when the firmware is upgraded (providing the features are available in the new firmware) although this is not guaranteed by Axis Communications. Always read the instructions and release notes available with each new release, before upgrading the firmware.

1. Save the firmware file to your computer. The latest version of the firmware is available free of charge from the Axis Web site at www.axis.com/techsup
2. Go to Setup > System Options > Maintenance in the camera's Web pages.
3. In the Upgrade Server section, browse to the desired firmware file on your computer. Click Upgrade.


Upgrade Server
Upgrade the AXIS 210 Network Camera with the latest firmware.
Specify the firmware to upgrade to:
Browse...
and click
Upgrade
Note: Do not disconnect power to the unit during the flash upgrade. The unit restarts automatically after the upgrade has completed. (1-10 minutes.)

Notes:
- After starting the upgrade process, always wait at least 5-10 minutes before restarting the AXIS 210, even if you suspect the upgrade has failed.
- Your dealer reserves the right to charge for any repair attributable to faulty upgrading by the user.

Emergency Recovery Procedure

If power or the network connection to the AXIS 210 is lost during the upgrade, the process will fail and the unit will become unresponsive. A flashing red Status LED indicates a failed upgrade. To recover the unit, follow the steps below. The serial number is found on the underside label on the product casing.

1. Unix/Linux - From the command line, type the following:
   arp -s <IP address of AXIS 210> <Serial number> temp
   ping -s 408 <IP address of AXIS 210>

   Windows - From a command/DOS prompt, type the following:
   arp -s <IP address of AXIS 210> <Serial number>
   ping -l 408 -t <IP address of AXIS 210>

2. If the unit does not reply within a few seconds, restart it and wait for a reply. Press CTRL+C to stop Ping.
3. Open a browser and type in the AXIS 210's IP address. In the page that appears, use the Browse button to select the upgrade file to use, e.g. axis210.bin or axis211.bin. Then click the Load button to restart the upgrade process.
4. After the upgrade has completed (1-10 minutes), the unit will automatically restart and show a steady green on the Power and Status LED:s and flashing green or amber on the Network LED.
5. Reinstall the AXIS 210 starting with *Select Your Installation Method*, on page 10.

If the emergency recovery procedure does not get the AXIS 210 up and running again, please contact Axis support at www.axis.com/techsup/

Axis Support

If you contact Axis support, please help us to help you solve your problems, by providing the server report, the log file and a brief description of the problem.

Server Report - go to Setup > System Options > Support Overview. The server report contains important information about the server and its software, as well as a list of the current parameters.

The Log file is available from Setup > System Options > Logs & Reports. The Log file records events in the unit since the last system restart and can be a useful diagnostic tool when troubleshooting.

Symptoms, Possible Causes and Remedial Actions

Problems setting the IP address

When using ARP/Ping.	Try the installation again. The IP address must be set within two minutes after power has been applied to the camera. Ensure the Ping length is set to 408. Please see *Manual Installation with ARP/Ping*, on page 13.
The camera is located on a different subnet.	If the IP address intended for the AXIS 210 and the IP address of your computer are located on different subnets, you will not be able to set the IP address. Contact your network administrator to obtain an appropriate IP address.
The IP address is being used by another device	Disconnect the AXIS 210 from the network. Run the Ping command. (In a Command/DOS window, type ping and the IP address of the unit). If you receive: Reply from <IP address>: bytes = 32; time = 10 ms..... - this means that the IP address may already be in use by another device on your network. You must obtain a new IP address and reinstall the unit. If you see: Request timed out - this means that the IP address is available for use with your camera. In this case, check all cabling and reinstall the unit.
Possible IP address conflict with another device on the same subnet.	The static IP address in the AXIS 210 is used before the DHCP server sets a a dynamic address. This means that if the same default static IP address is also used by another device, there may be problems accessing the camera. To avoid this, set the static IP address to 0.0.0.0.

The AXIS 210 cannot be accessed from a Web browser

The IP address has been changed by DHCP.	1) Move the AXIS 210 to an isolated network or to one with no DHCP or BOOTP server. Set the IP address again, using the AXIS IP Utility (see the Installation Guide) or the ARP/Ping commands. 2) Access the unit and disable DHCP in the TCP/IP settings. Return the unit to the main network. The unit now has a fixed IP address that will not change. 3) As an alternative to 2), if dynamic IP address via DHCP or BOOTP is required, select the required service and then configure IP address change notification from the network settings. Return the unit to the main network. The unit will now have a dynamic IP address, but will notify you if the address changes.
Other networking problems.	Test the network cable by connecting it to another network device, then Ping that device from your workstation. See the instructions above.

Cannot send notifications, uploads, alarms, etc, to a destination outside the local network

Firewall protection.	The camera can be configured to use a SOCKS server to reach networks on the other side of a firewall/proxy server.

Your AXIS 210 is accessible locally, but not externally

Firewall protection.	Check the Internet firewall with your system administrator.
Default routers required.	Check if you need to configure the default router settings.

MPEG-4 multicast is not displayed on the client

Multicast not enabled.	Check the network RTP settings, see *RTP (multicast)*, on page 40.
Wrong multicast address.	Check with your network administrator what addresses are allowed.
Minimum client requirements not fulfilled.	Check the client computer specifications, see *Client System Requirements*, on page 14.
Wrong network interface on client.	Check that correct network interface is selected in the AMC control panel applet (network tab).
AXIS provided MPEG-4 decoder is not used	In the AMC control panel applet, select the MPEG-4 tab and press the button Set to default MPEG-4 decoder
Firewall protection	Check the Internet firewall with your system administrator.

Only accessible by local clients	Check if your router supports multicast or if you need to configure the settings of the routers between the client and the server. It might be necessary to increase the TTL (time to live, see *RTP (multicast)*, on page 40.
Poor rendering of MPEG-4 images	
Wrong color depth enabled in client.	Check that 16 or 32 bit color depth is chosen in the client.
Blurry text overlay image or other problem with rendering.	Advanced Video Rendering may have to be enabled. Change this setting on the AMC control panel applet, MPEG-4 tab.
Graphics card driver.	Check that the driver used is the latest available.
The Power indicator is not constantly lit	
Faulty power supply.	Check that you are using an AXIS PS-K power supply.
The Status and Network indicator LED:s are flashing red rapidly	
Hardware failure.	Contact your Axis dealer.
The Status indicator LED is flashing red and the camera is inaccessible	
A firmware upgrade has been interrupted or the firmware has otherwise been damaged.	See the *Emergency Recovery Procedure* above.
No images displayed on web page	
Problem with AMC. (*Internet Explorer only*)	To enable the updating of images in Microsoft Internet Explorer, set your browser to allow ActiveX controls. Also, make sure that AXIS Media Control (AMC) component is installed on your workstation.
Installation of additional ActiveX component restricted or prohibited	Configure your AXIS 210 to use a Java applet for updating the images under Live View Config > Layout > Default Viewer for Internet Explorer. See the online help for more information.
Video/Image problems, general	
Image too dark or too light.	Check the image settings. See the online help on Video and Image Settings.
Missing images in uploads.	This can occur when trying to use a larger image buffer than is actually available. Try lowering the frame rate or the upload period.
Slow image update.	Configuring, e.g. pre-buffers, motion detection, high-resolution images, high frame rates, etc, will reduce the performance of the camera.
Poor performance.	Poor performance may be caused by e.g. heavy network traffic, multiple users accessing the unit, low performance clients, use of features such as Motion Detection, Event handling., Image rotation other than 180 degrees.
Image gradually gets darker or lighter.	When using the AXIS 210 in locations lit by fluorescent lighting, check in the advanced image settings that the Exposure control is set to Flicker-free.
Color saturation discrepance between Motion JPEG and MPEG-4	Modify the settings on your graphics card.
Image loses focus often.	Disable the DC-Iris lens (AXIS 211 only) in the settings for Video & Image > Advanced. Focus the camera following the instructions on page 16. Then enable the DC-Iris lens (AXIS 211 only).
Lower frame rate than expected when viewing MPEG-4	
CPU usage too large.	Reduce number of applications running on the client computer.
Not enough bandwidth available.	Check with system administrator. Adjust settings of MPEG-4 profile, see *Advanced Settings*, on page 25.
Only decoding I-frames.	Check settings in AMC control panel applet, MPEG-4 tab.
Large images	Select lower imager resolution.
Image degenerating when viewing MPEG-4	
GOV length too long	Decrease the GOV length, see *Advanced Settings*, on page 25.

Poor quality snapshot images	
Screen incorrectly configured on your workstation	In Display Properties, configure your screen to show at least 65000 colors, i.e. at least 16-bit. Using only 16 or 256 colors will produce dithering artifacts in the image.
Browser freezes	
Netscape 7.x or Mozilla 1.4 (or later) can sometimes freeze on a slow computer.	Lower the image resolution.
Problems uploading files	
Limited space.	There is only limited space available for the upload of your own files. Try deleting one or more existing files, to free up space.
Overlay is not displayed	
Total size of image and text overlay exceeds maximum size of 640x480.	Using a text overlay affects the amount of space available to the overlay image. The text overlay occupies proportionally more and more space the lower the resolution, i.e., 16 pixels in height at 640x480, 32 pixels at 320x240 and 64 pixels at 160x120. Because of this, changing to a lower resolution after configuring an overlay image and a text overlay may cause the total overlay size to exceed the maximum size of 640x480, and no overlay will be displayed.
Motion Detection triggers unexpectedly	
Changes in luminance.	Motion detection is based upon changes in luminance in the image. This means that if there are sudden changes in the lighting, motion detection may be triggered mistakenly. Lower the sensitivity setting to avoid problems with luminance.

For additional assistance, please contact your reseller or see the support pages on the Axis Website at www.axis.com/techsup

The I/O Terminal Block

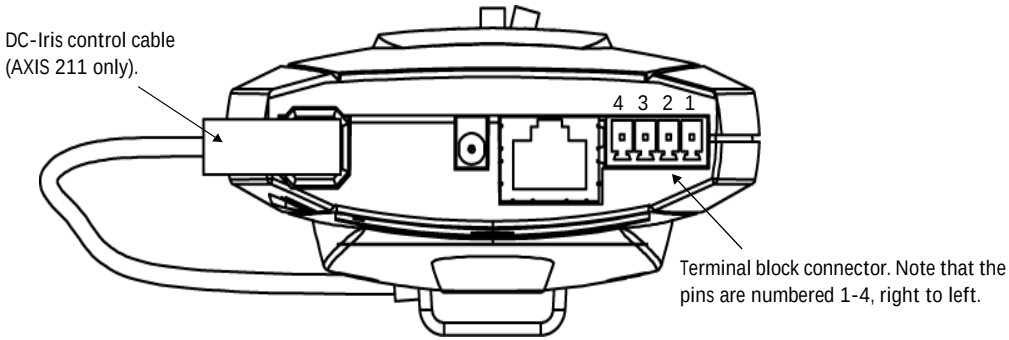
Pinout and Interface

The 4-pin I/O terminal block connector provides the interface to:

- 1 transistor output
- 1 digital input
- auxiliary power and GND

The terminal block is used in applications for e.g. motion detection, event triggering, time lapse recording, alarm notification via email, image storage to FTP locations, etc.

- Input - for connecting e.g. a doorbell. If the doorbell is pressed, the state changes and the input becomes active (shown under Event Configuration > Port Status).
- Output - connects e.g. an alarm device that can be activated by Output buttons on the Live View page, or by an Event Type. The output will show as active (Event Configuration > Port Status) if the alarm device is activated.

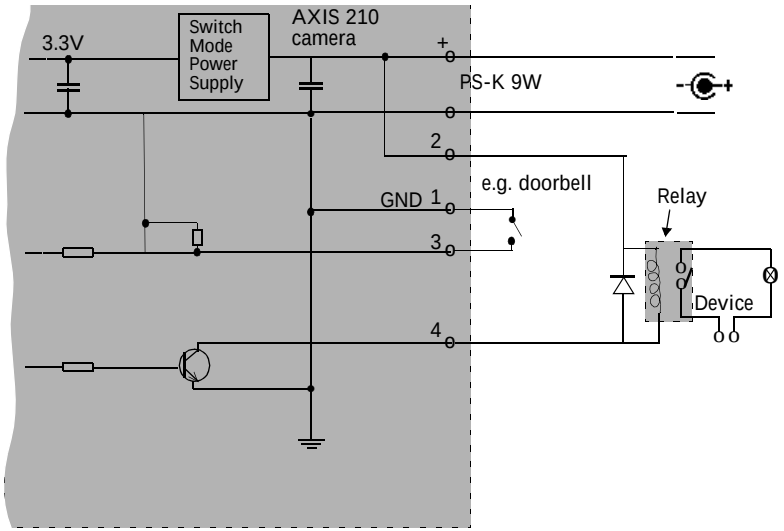


Pin	Function	Description
4	Transistor Output	With a maximum load of 100mA and a maximum voltage of 24V DC, this output has an open-collector NPN transistor with the emitter connected to pin 1 (GND). If used with an external relay, a diode must be connected in parallel with the load, for protection against voltage transients.
3	Digital Input	Connect to GND to activate, or leave floating (or unconnected) to deactivate.
2	Auxiliary DC Power Input	7-20 VDC/min 7W. Electrically connected in parallel with the PS-k power connector, this pin provides an auxiliary connector for mains power to the unit. If the unit is powered via this pin, a fuse should be used (rating: 1A Slow). This pin can also be used to power auxiliary equipment, max 100mA, but note that this is not possible when the AXIS 211 is powered by PoE.
1	GND	

Connect input/output devices to the terminal block as follows:

1. Loosen the corresponding screw on top of the pin (see above for the correct pin to use).
2. Push the cable into the connector and secure it by fastening the screw.
3. Once devices are connected, connect the terminal block to the camera, making sure that all cables are securely fastened.

Schematic Diagram - Terminal Connectors



Technical Specifications

Item	Specification	
Supported Operating Systems	Windows (XP, 2000, NT4.0, ME, 98) Linux, Mac OSX.	
Supported Web Browsers	For Windows - Internet Explorer 5.x or later, Mozilla 1.4* or later. For Linux - Mozilla 1.4* or later. For Mac OSX - Mozilla 1.4* or later, Netscape 7.1* or later. * = limited functionality	
Networking	Required protocols: Standard TCP/IP protocol suite. Supported protocols: 10baseT Ethernet, 100baseTX Fast Ethernet, TCP/IP, HTTP, FTP, DHCP, SMTP, NTP, ARP, BOOTP, DNS, UPnP, SOCKS v.4.0/v.5.0, RTP. Connection via RJ-45 twisted pair cable.	
Management	Remote configuration and status via web-based tools.	
Compression	Motion-JPEG. Snapshot JPEG images available. User-controlled compression level. MPEG-4. User controlled profile.	
Video Features	Time stamp, text overlay, image overlay, image rotation, color control. Maximum frame rate: 30 fps. Electronic Shutter: 2s - 1/12500s. Light sensitivity AXIS 210: 3 - 10 000 Lux. Light sensitivity AXIS 211: 0.75 - 500 000 Lux.	
Video Resolutions	640x480, 480x360, 320x240, 240x180, 160x120 Note that further resolutions may be available via the AXIS HTTP API. For more information, please see www.axis.com/techsup	
Lens (AXIS 210)	Standard CS mount lens. F2.0.	
Lens (AXIS 211)	Varifocal DC-Iris lens with CS Mount. F1.0.	
General I/O	1 digital alarm input and 1 output transistor (max 24V, 0.1 A) on a single terminal block connector.	
Pre/Post Alarm Buffer	Memory available for pre/post alarm image storage: up to 1200 KB.	
Security	Multi-user password protection, IP address filtering.	
Operating Conditions	Temperature: +5°C (41°F) to +45°C (113°F) Humidity: 20-80% RHG.	
Approvals - EMC	EN 55 024:1998+A1+A2 EN 55 022:1998+A1 (CISPR 22:1997+A1) Class B EN 61000-3-2:2000 EN 61000-3-3:1995+A1 VCCI:2003, Class B, ITE (CISPR 22:1997+A1:2000, Class B) C-Tick AS/NZS 3548 FCC part 15, Subpart B, Class B demonstrated by compliance with EN 55022:1998 (CISPR 22:1997) Class B	
Approvals - Safety	EN 60950	Power supply (PS-K) - UL, CSA
Hardware	ARTPEC-2 compression chip ETRAX-100 LX (32-bit RISC, 100MIPS CPU)	16 MByte RAM 4 MByte FLASH

Item	Specification	
Power	2 alternative power sources.	PS-K, 9V DC, 9W (included) 7-20V DC, min 7W
Power over Ethernet (AXIS 211 only)	Supports PoE according to IEEE 802.3af, Power Class 0 (0.44 to 12.95W). Connection via RJ-45 network socket.	
Metrics - AXIS 210	Height: 38 mm (1 1/2") Width: 88 mm (3 7/16") Length: 146 mm (5 3/4")	Weight: 305 g (10 3/4 oz) Power supply excluded.
Metrics - AXIS 211	Height: 38 mm (1 1/2") Width: 88 mm (3 7/16") Width incl. DC-Iris connector: 95 mm (3 3/4") Length excluding lens: 132 mm (5 3/16") Length including lens: 172 mm (6 15/16")	Weight: 345 g (12 3/16 oz) Power supply excluded.
Example image file sizes	Resolution 640x480: 3.6 - 300 KB Resolution 320x240: 0.9 - 100 KB Resolution 160x120: 0.2 - 20 KB	
Complimentary software	AXIS Media Control (AMC) - ActiveX component software required for Microsoft Internet Explorer - installed automatically on first use.	Optional: AXIS IP Utility - for installation in Windows.
MPEG-4 licensing	License for one MPEG-4 encoder and one MPEG-4 decoder is included.	Additional licenses can be bought separately from Axis Communications.

Glossary of Terms

ActiveX - A control (or set of rules) used by a browser. ActiveX controls are often downloaded and installed automatically as required.

AMC - AXIS Media Control. The control required for viewing images in Internet Explorer. Installs automatically on first use.

API - Application Programming Interface. The Axis API can be used for integrating Axis products into other applications.

ARP - Address Resolution Protocol. A protocol for assigning an IP address to a physical device address that is recognized in the local network. The ARP command can be used to set the IP-address for your product.

ARTPEC - Axis Real Time Picture Encoder - used for image compression.

CGI - Common Gateway Interface. A set of rules (or a program) that allows a Web Server to communicate with other programs.

Client/Server - Describes the network relationship between two computer programs in which one, the client, makes a service request from another - the server.

DC-Iris - This special type of iris is electrically controlled by the Axis camera, to automatically regulate the amount of light allowed to enter.

DNS - The Domain Name System (DNS) locates and translates Internet domain names into IP (Internet Protocol) addresses.

Ethernet - A widely used networking standard.

ETRAX - Axis' own microprocessor.

Firewall - A virtual barrier between a LAN (Local Area Network) and other networks, e.g. the Internet.

FTP - File Transfer Protocol. Used for the simple transfer of files to and from an FTP-server.

HTML - Hypertext Mark-up Language. Used widely for authoring documents viewed in web browsers.

HTTP - Hypertext Transfer Protocol. The set of rules for exchanging files (text, images, sound, video, and other files) on the World Wide Web.

Intranet - A private network limited to an organization or corporation. Usually closed to external traffic.

IP - Internet-Protocol. See TCP/IP.

IP address - A unique number used by a network device, to allow it to be identified and found on the network. The 32-bit IP address is made up of four groups (or quads) of decimal digits separated by periods. An example of an IP address is: 192.168.0.1

ISMA - Internet Streaming Media Alliance

JPEG - A standard image format, used widely for photographs. Also known as JPG.

LAN - A local area network (LAN) is a group of computers and associated devices that typically share common resources within a limited geographical area.

Linux - A popular operating system, which is “open source” and practically free of charge.

Lux - A standard unit for the measurement of light, where 1 Lux equals the light emitted from a single candle at a distance of one meter.

Mbit/s - Megabits per second. A unit for measuring speeds in networks. A LAN might run at 10 or 100 Mbit/s.

MPEG-4 - A standard video format, used for low bandwidth video streams.

Multicast - The same information is sent only once and only to the intended recipients.

NWAY - A network protocol that automatically negotiates the highest possible common transmission speed between two devices.

Ping - A small utility used for sending data packets to network resources to check that they are working and that the network is intact.

Pre/post alarm image - The images from immediately before and after an alarm.

Protocol - A special set of rules governing how two entities will communicate. Protocols are found at many levels of communication, and there are hardware protocols and software protocols.

Router - A device that determines the next network point to which a packet should be forwarded on its way to its final destination. A router is often included as part of a network switch (see below).

RTP- Real-Time Transfer Protocol. A transfer protocol designed for delivery of live contents, e.g. MPEG-4.

SMTP - A common e-mail protocol.

Subnet Mask - An IP address consists of two components: the network address and the host address. “Subnetting’ enables a network administrator to further divide the host part of the address into two or more subnets. The subnet mask identifies the subnet to which an IP address belongs.

Switch - Whilst a simple hub transmits all data to all devices connected to it, a switch only transmits the data to the device it is specifically intended for.

TCP/IP - Transmission Control Protocol/Internet Protocol. A suite of network protocols that determine how data is transmitted. TCP/IP is used on many networks, including

the Internet. TCP keeps track of the individual packets of information and IP contains the rules for how the packets are actually sent and received.

URL - Uniform Resource Locator. An "address" on the network.

Varifocal - A varifocal lens provides a wide range of focal lengths, as opposed to a lens with a fixed focal length, which only provides one.

WAN - Wide-Area-Network. Similar to a LAN, but on a larger geographical scale.

Web server - A program on a computer (server) providing the resources (e.g. web pages) requested by the user (client).

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